SCIENCE.

FRIDAY, JULY 25, 1884.

COMMENT AND CRITICISM.

THE long uncertainty has been ended sooner than could reasonably have been expected. Greely and the remnant of his party have been rescued from imminent death. The energy, boldness, and judgment of our naval officers have triumphed over all obstacles; and, in spite of inexperience in such work, complete success has been attained. With the enfeebled survivors were rescued the complete records of the work at the station, such instruments as were originally taken from Lady Franklin Bay, and the mortal remains of those who had succumbed, except a few who had become the prey of winds and currents.

The party accomplished all that they were sent to do, and much more, without loss of life, serious accident or disease, to any of its members. Making a successful retreat with records, instruments, and all hands, to a point where a sufficient store to have carried them through the winter should have been in waiting for them, and where it is even probable a vessel might have safely rescued them in the autumn of 1883, it was their fate to suffer and die from causes due largely to the ignorance and incompetency of others. Fortunately it is not our duty to allot the blame, or specify the acts, or failures to act, which brought about the disaster. It will, without doubt, form the subject of official inquiry, to which it may safely be left. Meanwhile the victims of stupidity are charged by the great mass of sympathizers to the account of arctic exploration.

In this journal (No. 60) we stated that it was probable that Greely started southward from Lady Franklin Bay in July or August, 1883; that the members of the party were living and in good health at that time; that a successful retreat to Cape Sabine would depend upon the opportunity of using their boats; that it was impossible for them to carry more than five or six months' provisions south with them; that it did not seem likely that there were provisions enough at Cape Sabine to carry them through the winter; that they would probably be found at Cape Sabine when navigation opened in 1884; that the prospect of the party reaching the eastern side of Smith Sound was almost unworthy of serious consideration; and that the programme which would waste the time of the relief-ships on the east side of Smith Sound was open to severe criticism. The remarkable manner in which these conclusions (which merely voiced the general opinion of accessible arctic experts) have been justified by the facts is worthy the consideration of those who consider arctic travel a matter of luck rather than of study and experience.

The geographical results of Greely's work are detailed elsewhere in this issue. The most interesting to geographers are the details in regard to the form of the western part of Grinnell Land and the physical features of that area, and the discovery of abundant game and recent Eskimo traces in its northern part. The additions to the shore-line of North Greenland are also very welcome, though the practical proof of the insularity of that continent had been already given by Bessels in his discussion of the Greenland tides. The reaching by Lockwood and Brainard of the highest northern latitude yet attained appeals strongly to American sentiment. The story of heroic endeavor, and patient, loyal endurance, will be heard with kindling hearts and filling eyes by the brave and enterprising of all nations, while universal sympathy goes forth to those whose best and dearest heroically met their fate, as their last faint breath went out beneath the cold gray arctic sky.

When the announcements were made of the honorary degrees conferred at the tercentenary celebration of the University of Edinburgh, some surprise was felt that American men of science appeared to be forgotten, while American physicians and theologians were selected with obvious discrimination for their academic distinctions. It is now stated that the authorities at Edinburgh intimated to several Americans devoted to science, that the university would confer upon them the degree of doctor of laws if they would come and receive it, and that, in case of their non-attendance this year, they might be admitted to the honor if present on some future occasion. The list of men thus chosen may not be authentic, and we shall therefore refrain from reprinting it; but, as given in the newspapers, it includes, among others, a geologist and zoölogist, a botanist, an astronomer, and a philologist, every one of whom would be acknowledged in this country as a worthy representative of American science.

There is fine opportunity to make the coming electric exhibition in Philadelphia a public educator as well as a brilliant display by giving due care to the explanation of the different groups of exhibits. Only a very small share of the visitors to such exhibitions understand what they see; but by far the greater number would gladly learn more than they know if the way were open. The untaught majority of the visitors may wonder and admire, but they really learn very little. Their curiosity is excited, but their reason is not satisfied. Printed explanations are seldom given: verbal explanations are often too technical to be of much value, even when the exhibiters can be found, and are willing to tell their story for the hundredth time.

This might all be changed, if an extended series of well-considered explanatory cards were composed with the special object of reaching the most elementary inquiry, and arranged in such succession that the visitors who follow around the aisles in proper order should read a concise statement of the elements essential to the various contrivances in the bewildering display. Take, for example, the batteries, which will surely be exhibited in large variety. At the beginning of this class of exhibits, there should be a large card on which should appear some such statement as the following: "The essential elements of a battery are so and so; these essentials are reached in various ways, thus and thus and thus." Then in further explanation of the different kinds of batteries, which should be classified as rationally and as distinctly as possible, the advantages claimed for each class could be appropriately defined, as cheapness, durability, intensity, constancy, etc.; or the special object in view might be stated, and the peculiar means to this end briefly set forth.

There would be a double gain accomplished by such a method. The direct gain would be a distinctly better understanding of the exhibition among the many intelligent visitors who were not especially informed on electrical matters. The indirect gain would be a step in general education, in the recognition of the relation between the essentials of an apparatus and the contrivances by which they are attained. For most persons the contrivances are of small importance: they cannot be remembered, except in a few cases where peculiar reasons may give them special interest. But the essentials, the principles of construction freed from the details, are of the greatest service to all. The time and work required for the preparation of such guide-cards would be great, but the public would consider them well expended.

LETTERS TO THE EDITOR.

Cretaceous phosphates in Alabama.

In a previous letter I announced the occurrence of phosphates in the lower beds of the rotten limestone of the cretaceous formation of Alabama. I have since discovered that they are by no means confined to this horizon.

Immediately overlying the rotten limestone, and forming the uppermost strata of the cretaceous formation, are beds of marls and clays, alternating with hard, crystalline, sandy limestones, usually assigned to the Ripley group of Professor Hilgard. Specimens examined from many localities show that these beds in Alabama, from Livingston in Sumter county, eastward nearly to the Georgia line, are very generally phosphatic.

The material from this horizon, which has been examined by me, consists, 1°, of marls — either calcareous clay marls, or light chalky marls — composed, in the main, of carbonate of lime (the few analyses of these marls which have been made, show an average content of about five per cent of phosphoric acid; they occur across the whole width of the state, and are, in many instances, in very good condition for spreading upon the land: a marl of this kind at Coatopa has already been used with very fine results); 2°, of limestone rock, usually crystalline, hard, and sometimes sandy, but occasionally soft and crumbling; in one locality the calcareous matter has been leached out, leaving a porous sandstone: this limerock, which is the Ripley limestone, holds from ten to fifteen per cent of phosphoric acid, and extends entirely across the state: the aggregate amount of phosphoric acid contained in it is enormous; 3°, of nodular or concretionary masses of phosphate of lime, and nuclei or casts of gasteropods, bivalves, nautili, baculites, etc.; these, wherever examined, appear to be nearly pure phosphate of lime, but are found in comparatively limited quantities: not more than half a dozen quantitative analyses have yet been made of the phosphatic material from these beds; but, in making the qualitative tests, I have always used equal quantities of the different substances, and have thus been able to form some estimate of their comparative value.

The outcrops of the phosphatic beds occurring at the base of the rotten limestone, already described in a former letter, pass near the following places, — Pleasant Ridge, Eutaw, Greensboro, Hamburg, Selma, Prattville, Wetumpka, Tuskegee, and Society Hill, — while the beds now described above, outcrop along a line about thirty miles south of the former, passing through or near the following places, — Livingston, Coatopa, Moscow, Dayton, Prairie Bluff, Minter Station, Fort Deposit, Union Springs, Flora, etc.; the one line of outcrop being along the northern border of the 'prairie region,' the other along its southern border.

It is, further, an interesting fact that the upper beds of the rotten limestone itself are phosphatic. I examined recently the outcropping limestone from Livingston for six miles northward, and in every case found it to be more or less phosphatic; and in a few places I found *nodular* phosphates in small quantity. In other localities, as at Boligee, and between Newberne and Uniontown, at a distance from either border of the rotten limestone, occur phosphatized nuclei of shells. I have not yet had the opportunity of examining the strata at these places, and cannot, therefore, say whether or not the phosphates are confined to these nuclei, but am inclined to think that phosphatized strata occur at intervals through the whole thickness of the rotten limestone, as well as at its base and summit.

Whether any of these phosphates may be profitably shipped to distant points or not, it is certain, that, in the phosphatic marls and greensands, our farmers, in the 'prairie region' at least, have the materials for restoring the fertility of their soils at a comparatively small cost.

EUGENE A. SMITH.

University of Alabama, July 12.

Swarming insects.

I am not a properly qualified reporter of scientific facts, but the following observations have interested me: —

I sat on the doorsteps of 626 Euclid Avenue some days ago, watching the 'Canada soldiers,' of which gnat-like looking insect I enclose a specimen. They filled the air. They were absolutely myriads. The north wind, I am told, brings them from over the lake; but they are ephemeral, and their dead bodies are almost as numerous on the pavements as their live bodies in the air.

As I sat watching their flight, my attention was attracted to a singular smoke-like appearance on the top of a tall elm which stood at the edge of the street-curb. From the topmost branches of this tree rose vertically into the air four or five waving, flickering tongues of what at first looked like smoke. To describe their peculiar lambent motion, I can think of nothing better than the 'cloven tongues of fire' mentioned in the 'Acts of the apostles;' or the darting, flashing spires of the aurora borealis, only the color was smoky, not fiery. I give a rude delineation. The

waving, playing motion of these smoky spires is simply indescribable. They would fade and re-appear, wave back and forth as if swayed by the wind, mount higher and higher, until sometimes one would leap up twenty, thirty, or forty feet into the air. The *look* was as if the tree was smoking, the thin wiry columns of smoke streaming up into the sky. Closer examination disclosed the fact that these pillars of smoke in the evening twilight were really columns of winged insects, but whether the 'Canada soldiers,' or a smaller insect, I could not see; and inquiry elicited the further fact that this phenomenon is not exceptional. Perhaps it has already been noted in your journal, but I venture to send you this brief and imperfect account of it. A Cleveland resident, to whom I have read this, is quite confident that it was a smaller insect which was thus disporting itself.

EDWARD ABBOTT.

Cleveland, O., July 9.

[The 'Canada soldier' sent is a large ephemerid, found in immense numbers about the Great Lakes. The pulsating swarms of small insects seen about the tree-top were undoubtedly formed of gnats (Chironomidae), allied to the mosquitoes. The phenomenon has been frequently witnessed, both in this country and in Europe, to the great astonishment of the spectators. — ED.]

THE ORGANIZATION OF AN INTERNATIONAL SCIENTIFIC ASSOCIATION.

Several months ago *Science* published an editorial on the proposed foundation of an International scientific association. Since that first public announcement of the project, interest in it has deepened and spread. There is now in circulation, for additional signatures, a request supported by some of the leading scientific men of America, and addressed to the two national associations which meet on our side of the ocean this year. This request is to the effect that the two bodies shall consider the advisability of forming an international association: it is therefore appropriate to consider the grounds upon which we may advocate the execution of the proposal.

There are many persons who have long held the conviction that some regular opportunity for international intercourse between scientific men, bringing them from all countries into personal contact with one another, would be equally useful and pleasant. The only feasible manner yet suggested, so far as I am aware, of insuring the desired opportunities, is to establish an international society after the general type of the national associations and the international congresses, such as the medical, geological, etc., — organizations which have already justified their existence by the good they have accomplished. It is believed that the time has now come for extending habitual scientific co-operation beyond the limits of each country, to all those that are active in the promotion of science. Moreover, the manifold sciences of the present have so many common interests, that the welfare of each is inseparable from the welfare of all; and therefore, when they all unite for the common good, will the highest purposes of knowledge be best served. This it is which renders a general scientific congress more advisable than a number of special ones. The body of wider purpose would also represent more fitly the full dignity of science.

What advantages may be expected from the proposed International scientific association? Foremost must be placed, I think, the opportunities for personal intercourse between men of the same interests, but who, living in countries wide apart, would otherwise never meet. Experience amply demonstrates the reality of the interest and advantage of contact, direct and immediate, of mind to mind, which affords an insight into another's way of thought otherwise impossible. This is because conversation enables one to get by a short cut to the pith of thought, and to secure an explanation of just whatever has been obscure in the conceptions of another. The action of others' minds becomes understood as it never can be from books. New points of view open up, and the error of the personal equation is diminished. Another advantage must be sought in the meeting of specialists of different branches, who mutually inform one another of the living interests of each other's science. The importance of the actual sessions lies in the discoveries and discussions filling them, and is so well recognized that this allusion is sufficient. As the association will have great dignity and high standing in all countries, it will be appropriate for it to undertake the adjustment of many of the international interests of science, such as the unification of standards, and other affairs requiring the concerted action of separate nations. The establishment of uniformity the world over, in many matters, may certainly be more authoritatively made through the medium of a representative congress of scientific men of all nations than by any other means.

As regards the special occasion of founding the new organization, the advocates of doing so in America this summer maintain that another opportunity is not likely to soon re-occur so favorable as will be afforded by the meeting of the British association in Canada, followed immediately by that of the American association in Pennsylvania. If the scheme is carried out, it will, in fact, be the legitimate and anticipated culmination of a movement of which the coming to America of the British association is one part. In 1881 the proposal was made that the American association invite the British to America. This was actively discussed; and finally it was determined — largely,

I believe, from motives of real modesty — to postpone the invitation, and issue instead a large number of special requests to individuals to attend from abroad the meeting of our association at Montreal. This duty fell to the local committee of Montreal in 1882. The large number of foreign visitors who came revived the hope that the British association could be induced to come over as a body. The matter was then independently taken up by the Canadians, and pushed generously and eagerly towards the great success which every one now anticipates for the gathering at Montreal. From the first it has been understood, that if the original enterprise, which was in many ways so full of difficulty, should be brought to a successful issue, then the still greater enterprise should be broached, and the foundation of a permanent international association be attempted.

It is hoped that the British association will take some action in the matter. It has been suggested that a committee with powers might be appointed to confer with the American association at Philadelphia. The organization of the latter body is such that no further official action on its part is possible until the time of meeting itself; but there can be no doubt as to the cordiality with which any proposal emanating from the British association will be received. At present no definite plans have been formed, as it has been felt that public discussion was necessary before making any decision; but, as it is advisable to gather as many suggestions beforehand as possible, I shall be glad to correspond with any one interested in the proposal.[1]

CHARLES S. MINOT.

THE IMPLEMENTS OF THE IGLOO.

IN my former article on the igloo of the Innuit, published in *Science* last August and September, I said, in closing, "I should like to give a few brief descriptions of those appurtenances that might be strictly called igloo accessories, as the native stone lamp and kettle, the well to fresh water through the thick ice beside the snow-hut, and many other minor items all growing out of the igloo itself; but this article has already grown to such dimensions that they must be laid aside." A letter from the editor, requesting to know more about the life of the Eskimos among whom I was thrown, has induced me to take up my abandoned subject as an appendix to my former article about the igloo itself.

The snow-stick, called by the Eskimos ah-now′-tuk, is a constant companion of the igloo, and is used to knock the snow off of the reindeer clothes or bedding, when by any chance it has gotten on them. After the igloos are built, when camping on a sledge-journey, the reindeer-skins that are to form the bedding are given a beating with the ah-now-tuk as they are taken from the sledge, before being put in the snow-house; and this beating must be very thorough if there has been a high wind with drifting snow during the day, or the sledge has upset, or any mishap has occurred to fill the hair with snow or ice. When a hunter comes into an igloo from the chase or a journey, he takes off his outer reindeer-coat (coo′-le-tah) and outer trousers (kok′-liks), both with their hair turned *outwards;* and, if there be any snow or ice on them, a few dexterous strokes with the snow-stick soon rids them of it, when they are carefully rolled up and put at the foot of the bed, or, if the native is going to retire for the night, under his head as a pillow. When severe exercise brings on profuse perspiration, this is taken up by the inner reindeer-clothes, with their hair turned *inwards*, in the shape of an evenly distributed moisture, which, in thick fur especially, seldom reaches to the skin itself; and, when these clothes are taken off for the night, this freezes into a hoar-frost-like covering, which is beaten off by the ah-now-tuk in the morning, before they are resumed. Sometimes it is impossible to thoroughly get rid of this sabulous ice, and nothing is more disagreeable to an explorer than to crawl out of a warm sleeping-bag in the morning, and crawl into this powdery ice still clinging to the fur of the inner clothes; but there is nothing to be done but to grin and bear it for the few short minutes it takes to warm the fur with the bare skin of the body.

The ah-now-tuk itself can be any sort of handy club that one can wield with the right hand, while the clothes, bedding, etc., are held in the left:[1] but there is usually a particular

[1] [Dr. Minot's address is 25 Mt. Vernon St., Boston, Mass. — ED.]

[1] I have spoken of the Innuit as *right-handed*. In connection with this remark, I think it would not be uninteresting to reproduce a small portion of my address before the New-York academy of sciences, Nov. 1, 1880, relating to the ambidexterity of the Innuit. I there said, "I have often been impressed with the

form made by the more industrious ones, that I have tried to represent in fig. 1; for, when ordinary sticks are used, it is in the most shiftless igloos and abject families, about whom nothing

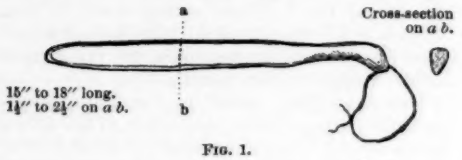


Fig. 1.

can be taken as typical. It is bluntly 'edged,' as shown in cross-section in fig. 1; and this facilitates the pounding-out of the snow where it has been deeply embedded by a strong wind, or ice which has frozen into the fur. They are generally made of hard wood (fig. 2), procured from the traders or whalers; but I understand, that, in intensely cold weather, oak or hickory is more liable to break than pine or spruce. When wood is very scarce, they are sometimes made of bone. Fig. 3 rudely represents one in the possession of the author, made by the Netschilluks in and around King William's Land, from the shin-bone of a reindeer, carved with grooves in the handle to fit the fingers. Oftentimes both wood and bone ah-now-tuks are carved into fanciful designs or figures, — an art for which the Innuits are so well celebrated. Sometimes, when the snow rests lightly on the garments to be cleaned, a glove is taken from the hand and used as an ah-now-tuk, especially where large, heavy bear-skin gloves are worn, — such as, I understand from Lieut. Ray, the Point Barrow natives use altogether. But it is easy to see

are clogged into the fur; for I have seen a reindeer-coat, soaked in water and covered with solid ice when frozen, rid of this so as to be no longer noticeable to the eye, by an Innuit's ap-

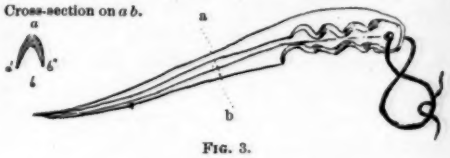


Fig. 3.

plication of the ah-now-tuk. It usually takes about two or three minutes to clean a coat; but, when the sledges have been out all day in a severe storm, half an hour is nothing unusual in cleaning every thing made of reindeer-skin. I have already hinted at one use of the snow-stick in my previous article, when the woman of the household would belabor the intruding dogs over the nose; and it is occasionally employed by the lords of creation in correcting their spouses, although I think I can say that such instances are more rare than among equally ignorant people of civilized countries.

The ice-chisel and ice-scoop, called by the Eskimos too′-oke and e′-lowt, are used in digging through the ice on a lake to get to fresh water. Going into camp near a lake or river, one or two persons, usually nearly grown boys, are sent out on the ice to dig a hole to get fresh water; for, if snow or ice have to be melted, a quantity of oil is consumed, and the warm meal is usually delayed about half or three-quarters of an hour thereby. The first thing to be done is to be sure and select

Fig. 2. — Snow-stick made from the wood of Franklin's ships.

that they cannot compare in efficacy with the true snow-stick, especially where ice and snow

a place that is not frozen to the bottom. In a hilly country, with steep granitic, trap, or similar banks to the lakes or rivers, any place will do. Wherever sedimentary deposits occur, more caution is needed. In a river the native is not a bad judge of the places where he will find the swiftest currents even under the ice, and here he knows that the glacial covering is the thinnest. Any snow banks or drifts that have been formed by the wind before the temperature in the winter reached its minimum, will give thinner ice, and consequently less work; for the snow can be shov-

ambidexterity of the various Eskimo tribes with whom I have come in contact, those not possessing this functional symmetry being rare exceptions to a general rule; and even in those, the superiority of dexterity over *gaucherie* is not so well marked as in their more civilized brethren. They drive their dogs, using their whip indifferently with either hand. They shoot their game indifferently from either shoulder, skinning and carving their carcasses without regard to the particular hand employed. In the most delicate and complicated tasks that they undertake, the use of one hand only is imposed until it is fatigued, when it is freely exchanged for the other. Assuming the simple-minded Innuit to be low in the ethnological scale, these facts might support the theory, so ably advanced by Dr. Daniel Wilson of Toronto, that the primitive condition of man and other vertebrates was, as their early foetal condition still is, one of complete bilateral symmetry, not only structural, but also functional."

elled off in two or three minutes, even from the deepest drifts. If these drifts should be covered with a crust, the native at once knows

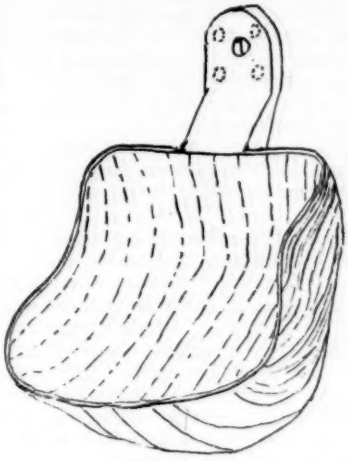


FIG. 4.

that they were formed during the October or November thaw, before the ice could have been very thick; and a couple of feet of drift will save him digging through nearly double

FIG. 5.

that amount of ice. And with many of those savage traits bordering on instinct, he can closely judge about the age of the drift; for, if made since the coldest weather, it has been no protection to the ice-covering, and only adds the labor of removing it, slight as it is. Where there is no covering to the clear blue ice, you will often see them extended full length, their little pug noses pressed against it; for they can, by varying peculiarities of the hues, tell if it be frozen to the bottom, or not. The site selected by all these conditions duly weighed, the operation is commenced by starting a hole about a foot and a half in diameter, and probably a foot deep, with the ice-chisel. In cutting with this, the ice has been broken up into small fragments; and these are taken out with the ice-scoop, and this alternation kept up until water is reached. The ice-scoop is the native ladle of musk-ox horn, firmly attached to a pole from eight to ten feet long (fig. 6, *b*). This ladle is made from the splayed base of the horn of the musk-ox. Fig. 4 represents one in the author's possession. Fig. 5 is taken from Hall's 'Narrative of the second arctic expedition.' Ordinarily they subserve the purpose of a tin cup, or similar utensil, and hold from a pint to nearly two quarts. When used for an e-lowt, four holes are bored in the heavy handle (as shown in fig. 4), and through these the ladle is lashed to the pole by sinew (fig. 7).

FIG. 6.

The ice-chisel (fig. 6, *a*) is any cutting instrument, like a bayonet, sabre-point, or sharpened iron, a mortising-chisel being the best, on a similar pole to that of the scoop. The Ookjooliks and Netschilluks used iron spikes from Sir John Franklin's ships. Usually it swells out near the butt, where it is lashed to the chisel; and the main object of this, besides giving securer lashings, is when the last few strokes are made, that let the water from beneath into the ice-well, with four or five as powerful and rapid thrusts as the digger can make. This projection knocks the lower rim of ice off, and keeps the well a uniform width throughout, — an important item, for through this hole many a meal of salmon may be caught. These last strokes must be very rapid; for, when the water starts into the well from such a depth, it comes apparently with the force of a fire-engine; and, once a foot or two deep,

FIG. 7.

the ice-chisel can no longer be worked. I have often seen the water come up the well with such impetuosity that it would overflow the ice where the ice-digger was standing, then sink a couple of feet in the well, and keep pulsating for five or ten minutes before coming to an equilibrium, generally about two to three inches from the upper ice-level. Besides the purpose of fresh water for cooking and drinking at a camp, the native sledgeman, if the ice be ripped from his sledge-runner by stones or ice while on a journey, will stop and dig through six or seven feet of ice to re-ice this part of his sledge — so important is it, if his vehicle be heavily loaded, or only dragged by a few dogs.

The average ice-wells are about six or seven feet deep. The thickest we had to dig on our King William Land sledge-journey was eight feet four inches; and I very seriously doubt if it ever gets more than a foot or a foot and a half deeper than this on fresh water, in any part of the arctic, where all the ice is melted in the summer. This distance, the natives told me, was the deepest they had ever seen. Of course their judgment can only be approximation, but nevertheless moderately reliable. A six-foot ice-well will be dug usually in about forty to forty-five minutes, although the more active may do it in half that time. If the ice has been much permeated by cracks, by digging on one of these, and especially where two of them cross, one may greatly lessen the time. Another use to which these two instruments are put, extraneous to their usual purpose, is to stick them upright in the snow at a camping-igloo, and on their tops the dog-harnesses, which, if made of seal-skin or any kind of skin, are liable to be devoured by their wearers when unusually hungry; and this position, eight or ten feet in the air, is a very safe place for them for the night. A native sledgeman, driving through rough, hummocky ice, often uses the ice-chisel to clear his way, and will make the angular ice in front of him disappear in a manner most astonishing. When one ice-well has been unsuccessful (that is, when the ice extends to the bottom), they may melt ice if they have plenty of oil: for by that time the igloo may be completed, and the lamp burning, although generally they can and do dig two by that time; and I have known cases where they were extremely anxious to economize oil, and six or seven wells were dug before they gave it up or were successful. It is very astonishing how soon they can tell whether the well is going to be a failure; the merest pinch of earth, way down in its depth of five or six feet, instantly arresting their eye, when the same would hardly be distinguishable on the surface, to the ordinary eye. That very instant they stop digging; for many of them are as careful of the edges of their ice-chisels as a man is of his razor.

The implements used in the construction of the igloo, the snow-knife and snow-shovel, have already been described in the article on the igloo.

The cooking-implements consist of the stone kettle (oo-quee'-sik) and stone lamp (kood'-lik), so often described by arctic travellers; and for that reason I will only dwell upon them briefly. They are described by Surgeon Fisher, of Parry's first expedition, as made of *lapis allaris*, or pot-stone. Dr. Hayes not inaptly compares the lamp, in shape, to a clam-shell; and, if the shell only had a slightly straighter edge, the comparison would be very good. Fig. 8 represents an outline view of one standing on the usual three sticks stuck in the snow-platform in front of the snow-bed, *a b* indicating the edge along which the flame is lighted. These lamps usually hold from half a pint to two or three quarts of oil, so variable are they in size; and this oil, when the lamp is properly adjusted by the rear stick, just touches the edge *a b*, along which there is placed a species of compact moss, that has been thoroughly dried, and rolled in the two open palms (as a sailor would prepare his pipe of tobacco) with a small quantity of fat, and lighted. This moss must be kept dense, or the lamp, with its six to thirty inches of flame along this edge, will smoke beyond endurance; and this is done with a small stick of hard wood a little larger than a pencil. This 'trimming' of the lamps is quite an accomplishment,

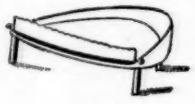


Fig. 8.

Fig. 9.

and only reaches perfection in the old women of the tribe, some of whom can prepare a lamp so that it will give a good steady flame for several hours, while usually half an hour is the best that can be expected. They are constantly broken; and those I saw thus injured were cemented with a mixture of blood, clay, and hair, according to the Innuits, although I

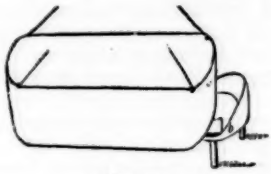


FIG. 10.

could not verify the mixture by watching the operation. Fig. 9 is a good view of a lamp (from Hall's 'Narrative of the second arctic expedition') that has been broken, and repaired by sinew; and, although I do not now recall any such mending, I should think it better than the other, although, as far as I could see, the first way was so perfect that new cracks would form directly beside the old, but not in it; and I suppose that the one mentioned by Hall may have had this cement in addition to the sewing, in order that it should hold oil. Heavy as it is, the natives carry it with them everywhere; and I hardly know of any thing in civilization that could effectually replace it, were they even inclined to do so. Its constant companion is the stone kettle, which is nothing more nor

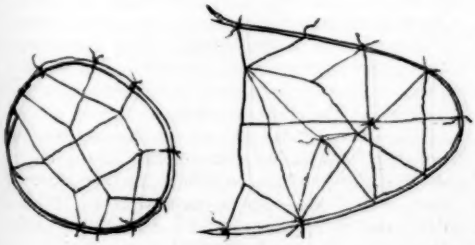


FIG. 11.

less than a rectangular vessel (fig. 10), holding from a quart to a gallon, whose flat bottom is a little shorter than the flame of the lamp directly over which it swings, so that the flame just touches its bottom. It is superior, for their use, to brass, copper, or sheet-iron vessels of any shape, and has seldom been replaced by them, even when these could be readily had; and the few cases I know have been unwilling ones. It suffers the same mishaps in breakage, mendings, and journeys, as its constant fellow the lamp, to which it is suited in size, and from which it is seldom parted. Over a framework of long wooden sticks, thrust through the side of the igloo if horizontal, or into the snow-platform if perpendicular, is laid a bent piece of wood or a barrel-hoop (fig. 11), across which is woven in rough design a number of sinew strings, forming a network; and on this net are laid the reindeer stockings and gloves, and every thing, in fact, that is required to be warmed or dried. This net can always be found in every igloo, and hanging from every sledge that is transporting household effects.

The seal-skin bucket (fig. 12) holds from two quarts to double as many gallons, and is generally made large, so that its contents will not freeze solid during the night. It is made of seal-skin (the smaller hair-seal), tanned so as to be deprived of the hair, and furnished with a handle of the same material sewed on. It always bulges out on one side into a sort of spout, where, by constant use in drinking from this place, they have produced it. When empty of water, and clogged with ice (as it usually is when they start to the ice-well to refill it), it is given a vigorous beating over a sledge, a hard snow-drift, or, if in a sportive mood, over a dog's head, the broken ice-splinters flying in every direction, leaving it as limber as a piece of canvas. The im-moo'-sik, or musk-ox ladle, already described as subserving another purpose, and seal-skin bucket, are slowly giving way to the utensils of a similar character of civilization.

FIG. 12.

The reindeer bedding can hardly be treated under this title, and the snow-knife and snow-shovel were described in my former article. The sum total of 'igloo implements' shows them, therefore, to agree in simplicity and small numbers with all other implements with which the people wrest an existence from a niggardly nature.

FREDERICK SCHWATKA,
Lieut. U. S. army.

COUES'S KEY TO NORTH-AMERICAN BIRDS.

Key to North-American birds. Containing a concise account of every species of living and fossil bird at present known, from the continent north of the Mexican and United-States boundary, inclusive of Greenland. By Elliott Coues. 2d ed. Boston, *Estes & Lauriat*, 1884. 30+863 p., 561 fig. 8°.

The original edition of the 'Key,' published in 1872, consisting of three hundred and sixty-one imperial octavo pages and two hundred and thirty-eight woodcuts, is well known to all students of American birds. The present edition is not only 'entirely rewritten,' but contains nearly four times as much matter, and more than twice as many illustrations, as the first; yet in bulk the work is scarcely larger, being printed on thinner paper and in smaller type. While most of the old illustrations have been retained, many have been replaced by better ones, nearly one-half are added from the author's previous works and other published sources, while some fifty or more have been engraved expressly for this edition. While the old 'Key' has proved eminently useful, it was not without its defects, owing mainly to extreme conciseness of treatment. The present 'Key' is modelled on the plan of the old, and written in the same spirit, but is the same mainly in title.

The work opens with an 'historical preface,' occupying some sixteen pages, in which is felicitously sketched the history of North-American ornithology from its earliest beginning nearly to the date of the first edition of the 'Key.' The history is divided into 'epochs' and 'periods;' and the influence various writers have had upon the progress of the subject is judiciously weighed, and thrown into strong relief. Then follows the preface proper, in which the author explains the differences between the present edition and the earlier one, and makes his acknowledgments of aid, in the preparation of the work, received from various persons and sources.

The work proper is divided into four 'parts.' Part i. (pp. 1–58) is entitled 'Field ornithology,' and forms a manual of instruction for collecting, preparing, and preserving birds. This is a nearly verbatim reprint of a separate work having this title, published by the author in 1874, and already well known as a work of great practical usefulness to collectors. Part ii., 'General ornithology,' is devoted to an elementary exposition of the structure and classification of birds, and occupies pp. 59–236. It (1) defines birds as distinguished from other vertebrates, (2) discusses the principles of classification and their application, (3) gives definitions and descriptions of the exterior parts of birds, and (4) devotes nearly one hundred pages to the anatomy of birds, giving a general outline of the subject. Part ii. is very fully illustrated with well-chosen figures. The portion of the text devoted to the anatomy of birds is entirely new, and suffices to give very fairly the rudiments of the subject, which is all the author attempts. Many of the figures are drawn from nature by Dr. Shufeldt expressly for the work: others are after Parker, Huxley, and other well-known authorities. This part closes with artificial keys to the orders, sub-orders, and families. The attempt made in the old 'Key' to carry the student at once to the genera is here abandoned.

Part iii. (pp. 237–820), devoted to a 'Systematic synopsis of North-American birds,' forms, of course, the main body of the work. It describes all the species and sub-species, and defines the genera and higher groups of North-American birds. The descriptions are much amplified from those given in the first edition, but with the idea still in view of sharp definition. The references to authorities previously given are omitted, perhaps not unwisely; and in their place we find an epitome of the life-history of the species, with special reference to their nesting-habits, song, flight, and migrations. These display at its best the author's happy knack of hitting in few words a bird's leading and characteristic traits. More space is also given to an account of the geographical distribution of the various species and races, and the plumages of female and immature birds are more fully and much more satisfactorily indicated. An artificial key to the genera is given under each sub-family, and the species are analyzed under the genera. The matter given under each species is apparently about four to six times greater than in the old 'Key,' and is sufficient to give in satisfactory detail, not only its technical characters, but a glimpse at the *rôle* it plays in life. The number of species and sub-species treated is eight hundred and ninety-nine, which are placed under three hundred and forty-nine genera. The technical names are marked for accent, and they are also etymologically defined.

Part iv. (pp. 821–830) is devoted to a 'Systematic synopsis of the fossil birds of North America,' numbering forty-six species. Of these, twenty-five are tertiary (sixteen being referred to living genera), twenty cretaceous, and one Jurassic. This part, the author tells us, has been revised by Professor Marsh.

The classification adopted is at some points radically different from that employed in the first edition, particularly as regards the primary divisions of the class. The number of 'orders' now adopted for North-American birds, which belong all to the 'sub-class' Carinatae, is thirteen, subdivided into twenty sub-orders, sixty-three families, and seventy-seven subfamilies.

The twelve years which have passed since the appearance of the original edition of the 'Key,' have been marked by a striking increase in our knowledge of North-American birds. This advance would alone render any general work on the subject, published at that date, to some extent antiquated and unsatisfactory, however excellent it may have been in its time. The old 'Key' has unquestionably had a career of usefulness, and has helped on the advance that has so strongly characterized the last decade of North-American ornithology; the object of the treatise being to enable any one, by its aid, to identify his specimens without recourse to other information than that the book itself afforded. The undertaking was to some extent, at least in its methods, an innovation in zoölogy, and, however well it may have served its purpose, was obviously open to improvement, as such attempts must always be. Its defects were doubtless as quickly seen by its author as by others; and to remedy these, and bring the work down to date, the author was led to prepare this much enlarged, and in many ways greatly improved, second edition. The first edition emphasized, and in a large degree initiated, a new departure in respect to the status of many forms of North-American birds, which were degraded from species in regular standing to the grade sub-species or geographical races, and referred, as 'varieties,' to the species from which they were found to be not completely differentiated. Since that time the custom has arisen and become established, among American ornithologists, of discarding the interpolated 'var.' between the varietal and specific names of such forms; and, in accordance with this custom, the new 'Key' adopts the new 'trinomial' nomenclature for such intergrading forms as it seems wise to recognize in nomenclature. The names are, in fact, strictly those of the author's revised 'Check-list,' published in 1882, *plus* about a dozen since added.

As regards paper and typographical execution, the work is all that need be desired; the composition and press-work being that of the Cambridge University press. The author tells us that his publishers generously allowed him 'to make the book to suit himself,' sparing no expense to which they might in consequence be put. While some of the cuts are not above criticism, many of them are fine, so that their average grade is high; and in nearly every case their origin is duly accredited. The work as a whole is certainly very tastefully executed.

WIEDEMANN'S ELECTRICITY.

Die lehre von der elektricität. Von GUSTAV WIEDEMANN. 2 vols. Braunschweig, *Vieweg*, 1882–83. 11+795, 7+1002 p. 8°.

THE work which forms the subject of this notice is the successor to 'Die lehre vom galvanismus und elektromagnetismus," by the same author, first published in 1861, and followed by a second edition in 1874. Ever since its publication, the original work has been recognized as a practically exhaustive treatise on the topics included within the limits set by the author. Every discovery and observation is referred to the original publication, and its date is given. These references, so characteristic of the previous work, are continued and extended in the present treatise; and they form a classified index to the literature of electricity with the historical advantage of dates. One is surprised at the extent and range of the literature to which reference is made.

It is a suggestive fact, that a third edition simply of the original work could not represent the present knowledge of galvanic electricity and electromagnetism with that unity and completeness which the author's plan contemplated. The separation between static and galvanic electricity, which obtained up to the middle of the present century, can no longer be maintained: hence Professor Wiedemann wisely decided to extend the scope of his work, and to prepare with immense labor a practically new book under the more comprehensive title of 'Electricity.' This decision must be universally approved; for, aside from the very evident advantage of having a complete treatise in place of a partial one, the present conception of electricity forbids the treatment of the subject under its historical divisions. This division, which seemed imperative twenty-five or thirty years ago, has now become impossible. No fundamental differences between the two classes of electricity, due to different methods of generation, are now recognized. With galvanometers sufficiently sensitive to be affected by static discharges, on the one hand, and with electrometers capable of measuring

with great ease the difference of potential between the poles of a single cell, on the other, it is readily seen that static electricity acquires its predominant but not exclusive character from great difference of potential, while galvanic electricity produces its most striking effects by the transfer of great quantities of electricity as a current. The terms 'static' and 'galvanic' serve only to denote the extremes of electrical phenomena. In fact, the contact theory of potential difference unifies the whole science by giving a common account of the historically diverse forms of static and galvanic electricity; for it is now generally believed that the potential difference in frictional machines is due to contact of dissimilar bodies, while the old contest which began with Volta and Galvani is now set at rest by the happy compromise of assigning electromotive force to contact, and the energy of the current to chemical action.

The first volume of Professor Wiedemann's new work treats of general electrical phenomena, the excitation of electricity by contact of dissimilar bodies, Ohm's law and its consequences, determination of resistance in a great variety of bodies, measurement of electromotive force, and galvanic elements. The second volume is devoted to dielectrics, the theory of frictional and influence machines, the relations between heat and electricity, and to electrochemistry.

Mathematical treatment of the subject is introduced so far as it serves to establish general principles or theories, and to discuss methods and confirm results. Beyond this, mathematical discussions, which are interesting as mathematical exercises, but which do not advance our knowledge of physical principles, are either omitted entirely, or are referred to by citation.

The applications of electricity are noticed only so far as they serve to give completeness to a scientific knowledge of the subject.

It was reported a year ago that the manuscript of the two concluding volumes was nearly ready for the press.

Professor Wiedemann has placed all physicists under obligations by his full and logical presentation of all the facts and principles of the science of electricity. While the work does not possess the originality of Maxwell's, and is written with an entirely different purpose, it must, nevertheless, be classed with it as one of the great works on electricity. Considered from the point of view of giving a complete account of what is known respecting this branch of physics, and of showing what each investigator has contributed to our common stock of knowledge of electricity, this book is not equalled by any other in any language.

H. S. C.

NOTES AND NEWS.

No piece of news of wider interest has traversed the wires of two continents since *Science* was founded than that which announced last week the rescue of the Greely party. The story of their frightful sufferings, their sad losses, and the successful accomplishment of their duties, is briefly told in the two despatches from Lieut. Greely, which we print in full below. It appears, that, when found, they were huddled in a tent, which the force of the gale had blown down upon them. The strongest of them could hold aloft the signal-flag, to guide the relief-party they could hear but not see, for two brief minutes only; and the weakest begged to be left to die in peace. Their provisions were utterly exhausted, and they had been living for weeks on a stew made from their sealskin clothing, with lichens and small shrimps; and it is highly probable that a detention of the relief-party for two days would have cost the entire party their lives.

The following two despatches from Lieut. Greely were received by the chief signal-officer on July 17:—

Brainard, Bierderbick, Connell, Fredericks, Long, and myself, the sole survivors, arrived to-day, having been rescued at the point of death from starvation by relief-ships Thetis and Bear, June 22, at Camp Clay, north-west of Cape Sabine. All are now in good health, but weak. Sergeant Ellison, who was rescued, died July 8. Cross died last January; Christianson, Linn, Rice, Lockwood, Jewell, and Edwards, in April; Ellis, Rainston, Whisler, Israel, in May; Kingsbury, Salor, Henry, Bender, Pavy, Gardiner, Schneider, in June. Abandoned Fort Conger Aug. 9. Frozen in pack, off Victoria Head, Aug. 29. Abandoned steam-launch, Sept. 11, eleven miles north-east of Cocked Hat Island. When on the point of landing, we were three times driven by south-west storms into Nares Sea. Finally landed, Sept. 29, in Baird Inlet. Learning by scouting-parties of the Proteus disaster, and that no provisions had been left for us from Cape Isabella to Sabine, moved, and established winter quarters at Camp Clay, halfway between Sabine and Cocked Hat. An inventory showed, that by a daily ration of four and one-third ounces of meat, seven of bread and dog-biscuit, and four ounces miscellaneous, the party would have ten days' full rations left for crossing Smith Sound to Littleton Island, March 1. Unfortunately, Smith Sound remained open the entire winter, rendering crossing impossible. Game failed, despite daily hunting, from early in February. Before the sun returned, only five hundred pounds of meats were obtained. This year minute shrimps, seaweed, sassafras, rock-lichens, and sealskin were resorted to for food, with results as shown by the number of survivors. Last regular food issued May 14. Only a hundred and fifty pounds

of meat being left by Garlington, compelled me to send, in November, four men to obtain a hundred and forty-four pounds English meat at Isabella. During the trip, Ellison froze solid both hands and feet, and lost them all; surviving, however, through our terrible winter and spring, until July 8. Survivors owe their lives to the indomitable energy of Capt. Schley and Lieut. Emory, who, preceded by three and accompanied by five whalers, forced their vessels from Upernavik, through Melville Bay, into northwater at Cape York with the foremost whaler. They gained a yard whenever possible, and always held it. Smith Sound was crossed, and our party rescued, during one of the most violent gales I have ever known. The boats were handled only at imminent risk of swamping. Four of us then were unable to walk, and could not have survived exceeding twenty-four hours. Every care and attention were given us. Have saved and bring back copies of meteorological, tidal, astronomical, magnetic, pendulum, and other observations; also pendulum, Yale and standard thermometers, forty-eight photographic negatives, a collection of blanks and photographic proofs. Eskimo relics and other things necessarily abandoned. The Thetis remains here five days probably.

GREELY, *Commanding.*

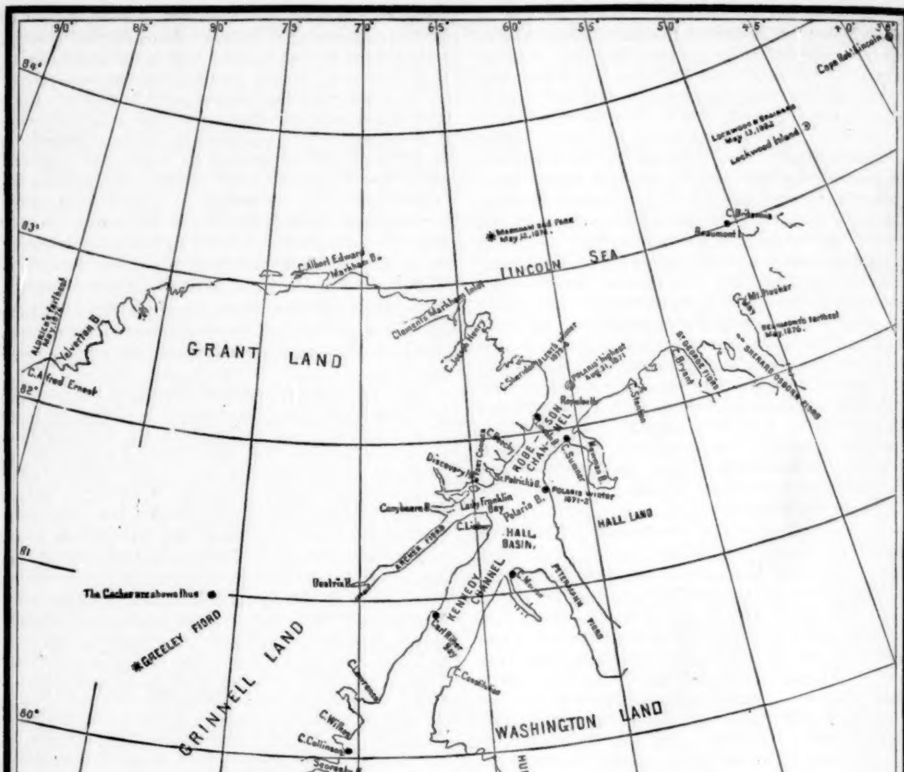
For the first time in three centuries, England yields the honor of the farthest north. Lieut. Lockwood and Sergeant Brainard, May 13, reached Lockwood Island (latitude 83.24°, longitude 44.5°). They saw, from a two thousand feet elevation, no land north or north-west, but, to the north-east, Greenland, Cape Robert Lincoln (latitude 83.35°, longitude 38°). Lieut. Lockwood was turned back, in 1883, by open water on North Greenland shore, the party barely escaping drift into polar ocean. Dr. Pavy, in 1882, following the Markham route, was adrift one day in polar ocean north of Cape Joseph Henry. Escaped to land, abandoning nearly every thing. In 1882 I made a spring, and later a summer, trip into the interior of Grinnell Land, discovering Lake Hazen, some sixty by ten miles in extent, which, fed by ice-caps of North Grinnell Land, drains Ruggles River and Weyprecht Fiord into Conybeare Bay and Archer Fiord. From the summit of Mount Arthur, five thousand feet, the contour of land west of the Conger Mountains convinced me that Grinnell Land tends directly south from Lieut. Aldrich's farthest in 1876. In 1883 Lieut. Lockwood and Sergeant Brainard succeeded in crossing Grinnell Land, and ninety miles from Beatrix Bay, the head of Archer Fiord, struck the head of a fiord from the western sea, temporarily named by Lockwood, Greely Fiord. From the centre of the fiord, in latitude 80.30°, longitude 78.30°, Lieut. Lockwood saw the northern shore termination some twenty miles west, the southern shore extending some fifty miles, with Cape Lockwood some seventy miles distant, apparently a separate land from Grinnell Land. Have named the new land Arthur Land. Lieut. Lockwood followed, going and returning, ice-caps averaging about fifteen feet perpendicular face. It follows that the Grinnell Land interior is ice-capped, with a belt of country some sixty miles wide between the northern and southern ice-caps. In March, 1884, Sergeant Long, while hunting, looked from the north-west side of Mount Carey to Hayes's Sound, seeing on the northern coast three capes westward of the farthest seen by Nares in 1876. The sound extends some twenty miles farther west than shown by the English chart, but is possibly shut in by land, which showed up across the western end. The two-years' station-duties, observations, all explorations, and the retreat to Cape Sabine, were accomplished without loss of life, serious accident, or even severe frost-bites. No scurvy was experienced at Conger, and but one death from it occurred last winter.

GREELY, *Commanding.*

On the same day, Commander Schley addressed the following telegram to the secretary of the navy, which summarizes the action of the relief squadron: —

The Thetis, Bear, and Loch Garry arrived here today from West Greenland. All well. Separated from Alert a hundred and fifty miles north during a gale. At nine P.M., June 22, five miles off Cape Sabine, in Smith Sound, Thetis and Bear rescued alive Lieut. A. W. Greely, Sergeant Brainard, Sergeant Fredericks, Sergeant Long, Hospital-Steward Bierderbick, Private Connell, and Sergeant Ellison, — the only survivors of the Lady Franklin Bay expedition. Sergeant Ellison had lost both hands and feet by frostbite, and died July 6, at Godhaven, three days after amputation, which had become imperative. Seventeen of the twenty-five persons composing this expedition perished by starvation at the point where found. One was drowned while sealing to procure food. Twelve bodies of the dead were rescued, and are now on board the Thetis and Bear. One Eskimo, Turnevik, was burried at Disco in accordance with the desire of the inspector of western Greenland. Five bodies, which were buried in the ice-fort near the camp, were swept away to sea by winds and currents before my arrival, and could not be recovered. The names of the dead recovered, with date of death, are as follows: Sergeant Cross, Jan. 1, 1884; Wederick, Eskimo, April 5; Sergeant Linn, April 6; Lieut. Lockwood, April 9; Sergeant Jewell, April 12; Private Ellis, May 19; Sergeant Rainston, May 23; Private Whisler, May 24; Sergeant Israel, May 27; Lieut. Kingsbury, June 1; Private Henry, June 6; Private Schneider, June 18. The names of the dead buried in the ice-fort, with date of death, where the bodies were not recovered, are as follows: Sergeant Rice, April 6, 1884; Corporal Salem, June 3; Private Bender, June 16; Acting Assistant Surgeon Pavy, June 6; Sergeant Gardiner, June 12, drowned while breaking through the newly-formed ice while sealing; Jans Edwards, Eskimo, April 24. . . .

Greely abandoned Fort Conger Aug. 9, 1883, and reached Baird Inlet Sept. 29 following, with entire party well. Abandoned all his boats, and was adrift for thirty days on ice-floe in Smith Sound. His permanent camp was established Oct. 21, 1883, at the point where he was found. During nine months, his party had to live upon a scant allowance of food brought from Fort Conger, — that cached at Payer



MAP SHOWING POINTS VISITED BY GREELY'S PARTY.

Harbor and Cape Isabella by Sir George Nares in 1875, but found much damaged by lapse of time; that cached by Beebe at Cape Sabine in 1882; and a small amount saved from the wreck of the Proteus in 1883, and landed by Lieuts. Garlington and Colwell on the beach where Greely's party was found camped. When these provisions were consumed, the party was forced to live upon boiled sealskin strips from their sealskin clothing, lichens, and shrimps preserved in good weather, when they were strong enough to make exertion. As thirteen hundred shrimps were required to fill a gallon-measure, the labor was too exhausting to depend upon them to sustain life entirely. The channel between Cape Sabine and Littleton Island did not close, on account of violent gales, all winter; so that two hundred and forty rations at the latter

point could not be reached. All Greely's records, and all the instruments brought by him from Fort Conger, are recovered, and are on board.

From Hare Island to Smith Sound I had a constant and furious struggle with ice in impassable floes. Solid barriers of ice were overcome by watchfulness and patience. No opportunity to advance a mile escaped me; and for several hundred miles the ships were forced to ram their way from lead to lead, through ice varying in thickness from three to six feet, and, when rafted, much greater. The Thetis and Bear reached Cape York June 18, after a passage of twenty-one days in Melville Bay, with the two advance ships of the Dundee whaling-fleet, and continued to Cape Sabine. Returning seven days later, fell in with seven others of this fleet off Wostenholme Island, and announced Greely's rescue to them, that they might not be delayed from their fishing-grounds, nor be tempted into the dangers of Smith Sound in view of the reward of twenty-five thousand dollars offered by Congress. Returning across Melville Bay, fell in with the Alert and Loch Garry off Devil's Thumb, struggling through heavy ice. Commander Coffin did admirably to get along so far with the transports so early in the season, before an opening had occurred. Lieut. Emory, with the Bear, has supported me throughout with great skilfulness and unflinching readiness in accomplishing the great duty of relieving Greely. . . . The Greely party are very much improved since rescue, but their condition was critical in the extreme when found, and for several days after. Forty-eight hours' delay in reaching here would have been fatal to those now living. The season north is late, and the closest for years. Smith Sound was not open when I left Cape Sabine. The winter about Melville Bay was the most severe for twenty years.

This great result is entirely due to the unwearied energy of yourself and the secretary of war in fitting out this expedition for the work it has had the honor to accomplish. W. T. SCHLEY, *Commander*.

From a despatch to the New-York *Herald*, we learn fuller details of the explorations, mostly undertaken by Lockwood and Brainard, to northern Greenland and the interior of Grinnell Land, which are positive additions to geography. The position of Lockwood Island (latitude 83° 24′ 30″ north, longitude 44° 45′ west) was astronomically determined by observations extending over two days; and, in their journey to this point, animal life was found to be abundant, with scant vegetation similar to that met with in Grinnell Land. Traces of hares, lemmings, ptarmigan, and snow-bunting, and the tracks of a bear, were seen, and droppings of the musk-ox as far as twenty miles north of Cape Britannia. The party was absent fifty-nine days. In one of their journeys in the interior of Grinnell Land, Lockwood and Brainard reached its western coast, and looked out on the polar sea. They found an immense glacier, named Agassiz Glacier, forming the ice-cap of southern Grinnell Land, with a belt of land sixty miles wide between it and the northern ice-cap. At the mouth of Greely Fiord they rested three days for observation, and determined their position to be latitude 80° 48′ 39″ north, longitude 78° 26′ west. From a cliff twenty-two hundred feet high, they saw, on a clear day, that in the north the land terminated in a high headland fifty to sixty miles distant, which they called Cape Brainard; and in the south, more distant, they named another headland Cape Lockwood. Beyond this, with open water between, they descried land which they took to be separate from Grinnell Land, and named Arthur Land. Lieut. Greely himself made two journeys into the interior, on which he was absent twelve and nineteen days respectively, and discovered a large body of fresh water, which he named Lake Hazen, fed by streams from the northern ice-cap, and discharging through Ruggles River into Weyprecht Fiord. The river was open at its mouth in April. Winter quarters of Eskimos were found, and some relics showing that they had possessed dogs, sleds, and iron. Two ranges of mountains were found parallel to and beyond the United States range, which he named Conger and Garfield ranges. Greely ascended Mount Arthur, about five thousand feet high, and the highest point in Grinnell Land. Game was found abundant on this journey, a hundred musk-oxen having been seen, with hares and birds.

The return party left Fort Conger with the steam-launch, ice-boat, and two boats in tow, on Aug. 9. The next day they reached Cape Baird, across Lady Franklin Bay. They were frozen for five days in the ice before reaching Cape Lawrence, and gained Cape Hawkes by the 26th, where they took in the provisions left there by the English, and, leaving the same day, had open water for six hours; then the pack closed around them, and they drifted with it, being finally driven to within six miles of Cape Albert, just south of Victoria Head. Here they were obliged to leave the launch and one of the boats; and, making two small sleds from the timber of the launch, they started over the ice for Cape Sabine, eleven miles off, making the slow progress of about a mile a day. On Sept. 13 they had to abandon their last boat, the large sled weakening under it. Twice they were driven back into Kane Basin by south-west gales. Finally the floe, much broken, was driven, on Sept. 22, into the mouth of Baird Inlet, the piece on which they were established being reduced to about fifty yards in diameter. They finally forced a landing on the northern side of the inlet on Sept. 29. The sad prospect before them was speedily discovered by scouting-parties; and, to be nearer the base of their scanty supplies, they made their way northward through a passage to Buchanan Straits (proving Cape Sabine an island), and then eastward along the coast, to where they made their final camp, the advance reaching here Oct. 15. Here they built a hut of stones, roofed with a broken whale-boat and canvas, and banked with snow. This they were compelled to abandon early in May from the moisture from the melting snow, and to occupy the tent higher up the hillside, where the relief-party found them. During the entire winter they had no fuel, except to warm, not cook, their food. As soon as their scanty stock of provisions

was known, they were reduced to a daily allowance of 14.88 ounces each; and this was afterwards still further reduced to 6 ounces, making it last until May 14. During this entire time all the game they obtained was twenty-four small foxes averaging four pounds each, fourteen ptarmigan, and sixty dovekies, excepting a small seal and a bear, killed in April. The last, weighing 257 pounds, undoubtedly saved the lives of the last survivors of the party.

— The managers of the Philadelphia electrical exhibition announce that the buildings are finished, and ready for the preliminary arrangements to accommodate exhibits. The committee urge upon all who have applied for space to begin preparations for installation.

— Dr. Lewis Swift, director of the Warner observatory, has received intelligence of the discovery of a comet by Prof. E. E. Barnard of Nashville, on the night of July 16; and the discovery was verified by the motion of the comet July 20. It is in the head of the Wolf (right ascension 15 hours, 50 minutes, and 30 seconds, declination south 37: 10), and is moving slowly in an easterly direction. It seems to be growing brighter, and is probably coming toward the earth. This is the first comet discovered in the northern hemisphere this year.

— From *Nature* we learn that the following are some of the special questions which have been arranged for discussion at the next social science congress, which is to be held at Birmingham on Sept. 17–24: — How far are the requirements of the country for well-trained teachers in elementary schools met by the pupil-teacher system and the existing training colleges? In testing the efficiency of schools, should processes, or 'results,' be chiefly regarded? Health: 1°. What is the best method of dealing with (*a*) town sewage, (*b*) the products of house and street scavenging, and (*c*) the products of combustion? 2°. What are the best means, legislative or other, of securing those improvements in the dwellings of the poor which are essential to the welfare of the community? 3°. How far may the average death-rate of a population be considered an efficient test of its sanitary condition, and by what means can the high death-rate of children be reduced?

— *Nature* states, that Dr. Chavanne, who is travelling on the Kongo for the Brussels national institute of geography, has established a meteorological observatory at Boma. Mr. Stanley has transferred the site of his station of Vivi to a tableland some fifteen hundred metres to the north; and a railway from the new station to the Kongo is in course of construction. A new station, called Sette-Cana, has also been established at the mouth of the small river Sette. Numerous small wooden houses are being made in Belgium to be transported to the new Vivi. A sanatorium has been constructed at Boma.

— In the report of the surgeon-general of the navy for 1881 (Washington, 1883, p. 70) are to be found photo-micrographs, and a short account of a comma-shaped bacterium, a rather unusual form, observed by Surgeon J. H. Kidder in water through which air had been aspirated (summer of 1881), and in well-water near Washington (1883). Until we have more precise descriptions of Koch's cholera bacillus than are yet available, it will be judicious for microscopists to bear in mind, in case of the appearance of cholera on this side of the Atlantic, that similar forms have been found in water when no case of cholera was known to exist. Dr. Kidder supposed the form which he photographed to be the same as, or very similar to, that noted and figured by Billroth (*Untersuch. über coccobacteria septica*, Berlin, 1874, taf. ii. *B., C.*), found in the droppings from an imperfect water-faucet in his work-room, and called by him Siphonomyxa nostocomii viennensis.

— The treasurer of the local committee of the American association reports that fifteen thousand dollars have been raised for the entertainment of the association while in Philadelphia, and recommends that the expenditures be kept within that sum, as it is doubtful whether more could be obtained.

— Dr. Benjamin Apthorp Gould, director of the observatory at Cordoba, Argentine Republic, has been elected an honorary member of the Royal meteorological society.

— An exhibition of appliances used in brewing will be held next September in Hanover.

— The *Kansas city review* states that Prof. J. G. Porter of the coast-survey has been elected astronomer of the Cincinnati observatory.

— By some good fortune whose explanation is too deeply political for our fathoming, the monthly Pilot charts continue to be issued from the hydrographic office; and the number for July maintains the value of its predecessors. It is notable for the number of waterspouts, of which eight are charted, and for the indication of currents by floating wrecks that have been observed on different dates. The schooner Warbeck drifted eastward just south of latitude 40°, from longitude 64° on April 9, to longitude 44° on June 12, thus travelling about nine hundred miles, or fourteen miles a day. A buoy, adrift from Cape Hatteras on June 1, was noticed on its way north-east on June 11, and was unfortunately picked up in latitude 40°, longitude 63° 30′, on June 21, having floated about five hundred miles in twenty days. These having followed the main extension of the Gulf Stream, their rate of motion was relatively rapid. The bark Ponema, that collided with the British steamer State of Florida on April 18, latitude 49°, longitude 36°, is reported from London to the hydrographic office as having been sighted on June 7, in latitude 49° 15′, longitude 33°, about thus having averaged only about two miles of eastward drifting a day. Again: the schooner Maggie M. Rivers, wrecked off Cape Hatteras on Jan. 7, was sighted on the eastern margin of the Gulf Stream on Feb. 6, and since then has been seen four times, the last date being June 14, wavering about with small change of position in the slack water a third way from the Bermudas to Norfolk.